

**UNITED STATES DEPARTMENT OF COMMERCE****Patent and Trademark Office**

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
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09/308,620 07/20/99 TSUBOSAKI

K 501.37120X00

EXAMINER

020457 MM91/1017
ANTONELLI TERRY STOUT AND KRAUS
SUITE 1800
1300 NORTH SEVENTEENTH STREET
ARLINGTON VA 22209

THAT...

ART UNIT

PAPER NUMBER

2811

DATE MAILED:

10/17/01

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary	Application No.	Applicant(s)
	09/308,620	TSUBOSAKI ET AL.
Examiner	Art Unit	
Luan Thai	2811	

The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

THE MAILING DATE OF THIS COMMUNICATION

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) Responsive to communication(s) filed on ____ .

2a) This action is **FINAL**. 2b) This action is non-final.

3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) Claim(s) 1-11 and 13-32 is/are pending in the application.
4a) Of the above claim(s) 3,10 and 15-32 is/are withdrawn from consideration.

5) Claim(s) _____ is/are allowed.

6) Claim(s) 1-2, 4-9, 11, and 13-14 is/are rejected.

7) Claim(s) _____ is/are objected to.

8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) The specification is objected to by the Examiner.

10) The drawing(s) filed on _____ is/are: a) accepted or b) objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11) The proposed drawing correction filed on _____ is: a) approved b) disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.

12) The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) All b) Some * c) None of:
1. Certified copies of the priority documents have been received.
2. Certified copies of the priority documents have been received in Application No. ____.
3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.

14) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) The translation of the foreign language provisional application has been received.

15) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) Notice of References Cited (PTO-892) 4) Interview Summary (PTO-413) Paper No(s). _____
2) Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) Notice of Informal Patent Application (PTO-152)
3) Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____. 6) Other: _____

DETAILED ACTION

This Office action is responsive to the amendment filed August 14, 2001.

Claims **1-11 and 13-32** are pending in this application.

Claims **3, 10, and 15-32**, have been withdrawn from consideration as being directed to a non-elected invention.

Claim **12** has been canceled.

Claim Objections

1. Claim 7 is objected to because of the following informalities: the limitation of "said passage" in claim 7 (line 4) should be changed to --said seal resin injection port--. Appropriate correction is required.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:
The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.
3. Claims 1-2, 4-9, 11, and 13-14 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The phrase "characterized in that said back surface of said semiconductor chip is defined by spin-etching **a surface opposite to said semiconductor chip so that**, etc." in the amended claim **1** is unclear as to how "a surface" opposite to "a semiconductor chip" can be defined.

Claims 2, 4-9, 11, and 13-14 are rejected since each includes the limitations of independent claim 1.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1-2, 4-8, 11, and 14, insofar as in compliance with 35 USC § 112, are rejected under 35 U.S.C. 103(a) as being unpatentable over Haghiri-Tehrani et al. (4,829,666 of record).

Regarding claims 1, 4, and 11, Haghiri-Tehrani et al.'s figures 1-5 show a semiconductor device including a semiconductor chip 4 having a principal surface and a back surface, opposite to the principal surface, disposed in a device hole 3 provided in a tape carrier 1 with one end of a lead 5 on the tape carrier being electrically connected to an external terminal of the chip 4, characterized in that the chip 4 is less in thickness than the tape carrier 1 (see figures 2-3), and that the chip is sealed by a seal resin material 7 so that the principal surface and the back surface of the chip are covered with the seal resin material 7, and that the seal resin material 7 has its upper and lower surfaces substantially identical in level to upper and lower surfaces of the tape carrier 1

(see figures 2-5). Haghiri-Tehrani et al. fail to teach the back surface of the chip is defined (or polished) by spin-etching technique.

However, Applicant's claims 1, 4, and 11 do not distinguish over the device of Haghiri-Tehrani et al. as detailed above regardless of the process used to polish a chip, because only the final product is relevant, not the process of making such as "*polished by a spin etching technique*". Note that a "product by process" claim is directed to the product *per se*, no matter how actually made, *In re Hirao*, 190 USPQ 15 at 17 (footnote 3). See also *In re Brown*, 173 USPQ 685; *In re Luck*, 177 USPQ 523; *In re Fessmann*, 180 USPQ 324; *In re Avery*, 186 USPQ 161; *In re Wertheim*, 191 USPQ 90 (209 USPQ 554 does not deal with this issue); and *In re Marrosoi et al.*, 218 USPQ 289, all of which make it clear that it is the patentability of the final product *per se* which must be determined in a "product by process" claim, and not the patentability of the process, and that an old or obvious product produced by a new method is not patentable as a product, whether claimed in "product by process" claims or not. Note that applicant has the burden of proof in such cases, as the above case law makes clear. See also MPEP 706.03(e).

Regarding claim 2, although Haghiri-Tehrani et al.'s reference does not specifically disclose a stress neutral plane extending parallel to the principal surface of the chip at a position along the thickness direction of the tape carrier, this feature is taken to be inherent in Haghiri-Tehrani et al.'s device since the claimed structure is identical to Haghiri-Tehrani et al.'s device which comprises a

chip being sealed by a seal resin material so that the principal surface and the back surface of the chip are covered with the seal resin material, and that the seal resin material has its upper and lower surfaces substantially identical in level to upper and lower surfaces of the tape carrier (see figures 1-3).

Regarding claims 5, 6, and 8, the proposed device of Haghiri-Tehrani et al. discloses all the limitations of the claimed invention as detailed above except for the tape carrier having a seal resin injection port or an air exhaust port for use in seal resin injection or during formation of the resin seal. Although Haghiri-Tehrani et al. fail to teach the tape carrier having a seal resin injection port or an air exhaust port for use in seal resin injection process, the final product of Haghiri-Tehrani et al. does not distinguish over the claimed structure of claim 5 regardless of the process used (e.g., with or without a seal resin injection port or an air exhaust port) to form the sealing resin for the device because only the final product is relevant, not the process of making such as using a seal resin injection port or an air exhaust port for the seal resin injection process. Note that a "product by process" claim is directed to the product per se, no matter how actually made, *In re Hirao*, 190 USPQ 15 at 17 (footnote 3). See also *In re Brown*, 173 USPQ 685; *In re Luck*, 177 USPQ 523; *In re Fessmann*, 180 USPQ 324; *In re Avery*, 186 USPQ 161; *In re Wertheim*, 191 USPQ 90 (209 USPQ 554 does not deal with this issue); and *In re Marrosi et al.*, 218 USPQ 289, all of which make it clear that it is the patentability of the final product per se which must be determined in a "product by process" claim, and not the patentability of

the process, and that an old or obvious product produced by a new method is not patentable as a product, whether claimed in "product by process" claims or not. Note that applicant has the burden of proof in such cases, as the above case law makes clear. See also MPEP 706.03(e).

Regarding claim 7, the proposed device of Haghiri-Tehrani et al. discloses all the limitations of the claimed invention (including a metal layer 3) as detailed above except for specifying the metal layer being an electroplated metal layer. Forming an electroplated metal layer on a tape carrier or a film carrier is conventional in semiconductor art. It would have been obvious to a person having skill in the art at the time the invention was made to form an electroplated metal layer on the tape carrier of the proposed device of Haghiri-Tehrani et al, since it has been held to be within the general skill of a worker in the art to select a known technique on the basis of its suitability for the intended use as a matter of obvious design choice. *In re Leshin*, 125 USPQ 416.

Regarding claim 14, Haghiri-Tehrani et al. disclose all the limitations of the claimed invention, including one end of the lead is directly coupled to the external terminal of the chip, as detailed above except for one end of the lead being electroplated. Electroplating is a well known technique in semiconductor art for simplifying the process of making electrical connections between a metal lead and an external terminal on a chip. It would have been obvious to one of ordinary skill in the art at the time the invention was made to apply electroplating

to one end of the lead of Haghiri-Tehrani et al.'s device in order to simplify the process of making electrical connections in the device.

6. Claims 9 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Haghiri-Tehrani et al. (4,829,666 of record) in view of Nakamura (5,729,051 of record).

Regarding claim 9, Haghiri-Tehrani et al. disclose all the limitations of the claimed invention as detailed above except for a bump electrode formed at the remaining end of the lead. Nakamura while relates to a similar package design teaches a bump electrode 5 being formed at the remaining end of the lead 3 for forming an electrically interconnect between the device and a mounting board. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use a gold bump as taught by Nakamura for forming electrical connection between the device and the mounting board.

Regarding claim 13, Haghiri-Tehrani et al. disclose all the limitations of the claimed invention as detailed above except for a gold bump electrode at the external electrode of the chip. Nakamura while relates to a similar package design teaches a gold bump electrode form on the external terminal of the chip for making electrical connection with the lead. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use gold bumps as taught by Nakamura to construct electrical connections between the chip external terminal and the lead in Haghiri-Tehrani et al.'s device.

7. Claims 5-8, insofar as in compliance with 35 USC § 112, are rejected under 35 U.S.C. 103(a) as being unpatentable over Haghiri-Tehrani et al. (4,829,666 of record) in view of Ueda et al. (5,196,917 of record).

Regarding claim 5, Haghiri-Tehrani et al. disclose all the limitation of the claimed invention as detailed above except for the tape carrier having a seal resin injection port for use in seal resin injection. Ueda et al. while relate to a similar structure design teach (figures 1-9) a passage 14 used in seal resin injection being formed at part of the tape carrier 1 thereby causing the device hole 3 to be coupled to a gate 17 of a metal mold structure 10 used during formation of the seal resin. It would have been obvious to one of ordinary skill in the art at the time the invention was made to apply Ueda et al.'s teachings to Haghiri-Tehrani et al.'s device in order to perform the process of encapsulating the device.

Regarding claim 7, the proposed device of Haghiri-Tehrani et al. and Ueda et al. discloses all the limitations of the claimed invention (including a metal layer 3) as detailed above except for specifying the metal layer being an electroplated metal layer. Forming an electroplated metal layer on a tape carrier or a film carrier is conventional in semiconductor art. It would have been obvious to a person having skill in the art at the time the invention was made to form an electroplated metal layer on the tape carrier of the proposed device of Haghiri-Tehrani et al, since it has been held to be within the general skill of a worker in

the art to select a known technique on the basis of its suitability for the intended use as a matter of obvious design choice. *In re Leshin*, 125 USPQ 416.

Regarding claims 6 and 8, the proposed device of Haghiri-Tehrani et al. and Ueda et al. discloses all the limitations of the claimed invention (including an air exhaust port 15 or 25, 35) as detailed above except for the metal mold structure having an air vent. An air vent forming in a mold is very conventional in semiconductor art, especially in semiconductor molding art, for allowing air to escape during formation of encapsulated injection. It would have been obvious to one of ordinary skill in the art at the time the invention was made to form an air vent on the tape carrier of the proposed device of Haghiri-Tehrani et al. and Ueda et al. for air to escape during encapsulated injection.

Conclusion

8. Applicant's arguments with respect to claims **1-2, 4-9, 11 and 13-14** have been fully considered, but they are deemed to be moot in view of the new grounds of rejection.
9. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action because the underlined portions of claims 1 and 5 raise new issues that would require further consideration and/or search. Accordingly, THIS ACTION IS MADE FINAL. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

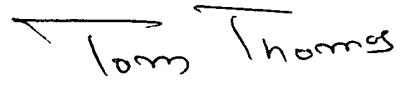
A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within

TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Luan Thai whose telephone number is (703) 308-1211. The examiner can normally be reached on 7:00 AM - 3:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on (703) 308-2772. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 308-7724 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.



TOM THOMAS
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800

Luan Thai
October 13, 2001